

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 10/804,221

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

Claim 1 (currently amended): An apparatus for producing a composite material including ceramic hollow particles and one of aluminum and aluminum alloy comprising:

a molten stock vessel including a vessel body including a gas inlet port at an upper part thereof and a molten stock outlet port at a bottom thereof; a chamber formed in said vessel body in a manner to intercommunicate said gas inlet port and said molten stock outlet port, and accommodating therein molten aluminum or molten aluminum alloy; a temporary sealing ceramic filter disposed in said chamber as seated against said bottom of said chamber in a manner to cover said molten stock outlet port;

a gas feeding member including a member body formed with a gas infeed port for feeding a predetermined gas into the chamber of said molten stock vessel, and disposed on the upper part of said vessel body in a manner that said member body thereof covers said gas inlet port as allowing said gas infeed port thereof to be communicated with said gas inlet port;

a packing including a through hole and seated against the bottom of said vessel body in a manner to allow the through hole thereof to be communicated with said molten stock outlet port;

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a forming mold including a mold body disposed under said molten stock vessel with said packing interposed therebetween; a slit formed in the mold body, communicated with the molten stock outlet port of said vessel body via the through hole of said packing, and accommodating therein a plurality of ceramic hollow particles; a vent hole formed at said mold body in a manner to communicate with the slit, and extended from a bottom of said mold body to form an air vent;

an air-removal ceramic filter disposed under said forming mold and seated against the bottom of said mold body in a manner to cover said air vent; and

a pressure die for pressurizing an array of said gas feeding member, said molten stock vessel, said packing, said forming mold and said air-removal ceramic filter along [[the]]an arrayed direction thereby bringing these components into tightly contacted relation,

wherein when said predetermined gas is fed into the chamber of said molten stock vessel via the gas infeed port of said gas feeding member, the pressure of the gas causes said molten aluminum or said molten aluminum alloy to flow through said temporary sealing ceramic filter and into the slit of said forming mold and then to fill in gaps between said plural ceramic hollow particles.

Claim 2 (currently amended): A method for producing a composite material including ceramic hollow particles and one of aluminum and aluminum alloy comprising the steps of:

loading an aluminum ingot or an ingot of aluminum alloy in a chamber of a molten stock vessel dismounted from a predetermined assembly position;

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heating said molten stock vessel to melt said aluminum ingot or said ingot of aluminum alloy into molten aluminum or molten aluminum alloy;

[[a]] heating and heat retaining a forming mold at a predetermined temperature, ~~the after~~ charging [[of]] plural ceramic hollow particles which are in the slit of said forming mold and in parallel with said melting step;

[[a]] pressurizing ~~the component array~~ an array of a gas feeding member, said molten stock vessel, a packing, said forming mold and an air-removal ceramic filter along [[the]] an arrayed direction by a pressure die after terminating said heating and heat retaining step for heating said forming mold and assembling said molten stock vessel, which includes said molten aluminum or said molten aluminum alloy, finished with said melting step on [[a]] the packing; and

infiltrating said molten aluminum or said molten aluminum alloy in gaps between said plural ceramic hollow particles by feeding said predetermined gas into the chamber of said molten stock vessel via [[the]]a gas infeed port of said gas feeding member and utilizing the pressure of the predetermined gas to cause said molten aluminum or said molten aluminum alloy to flow through [[said]]a temporary sealing ceramic filter and into the slit of said forming mold.

Claim 3 (original): A method for producing a composite material including ceramic hollow particles and one of aluminum and aluminum alloy as claimed in claim 2, wherein the feeding of said predetermined gas into the chamber of said molten stock vessel is terminated

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after the temperature of said forming mold is lowered to below a predetermined solidification temperature of said molten aluminum or said molten aluminum alloy.

Claim 4 (original): A method for producing a composite material including ceramic hollow particles and one of aluminum and aluminum alloy as claimed in claim 2, wherein the composite material including said plural ceramic hollow particles and one of aluminum and aluminum alloy is released from the slit of said forming mold after the temperature of said forming mold is lowered to below a predetermined releasable temperature for the composite material.